United States
Department of
Agriculture

Soil
Conservation
Service

P.O. Box 2890
Washington, D.C.
20013

October 5, 1982

NATIONAL SOIL TAXONOMY HANDBOOK
430-VI
ISSUE NO. 2

Purpose. To distribute current amendments to Soil Taxonomy, Agriculture Handbook 436.

Effective Date. These amendments and revisions are effective when received.

Background. These amendments are transmitted as changes to Soil Taxonomy, Agriculture Handbook 436. These amendments supplement those in Issue No. 1 of this handbook as the only ones now approved. In a few months, a revised draft of the keys to Soil Taxonomy will be distributed. As this draft will include the changes contained in Issues No. 1 and 2 of the National Soil Taxonomy Handbook, we suggest that changes no longer be marked in the text of Soil Taxonomy, although notations may be made in sections that are referred to often. As the first three digits (615) will be the same for all amendments, only the numbers and appropriate letters following the decimal (.10 (h), for example) may be noted in the margins of Soil Taxonomy.

Filing Instructions. File this copy of the changes in a 3-ring binder with Issue No. 1. It is suggested that you keep this binder with the Soil Taxonomy volume for easy reference.

Replace 615 contents of Issue No. 1 with the new enclosed contents. File 615-2a after 615-2. File 615-15 - 615-25 after 615-14.

Supplementation. States and NTC's may not supplement the handbook.

Ralph J. McCracken

RALPH J. McCRACKEN
Deputy Chief
for Natural Resource Assessments

DIST: NSTH

CONTENTS

PART 615 - AMENDMENTS TO SOIL TAXONOMY

Sec.	
615.00	General
615.01	Addition of particle-size classes
615.02	Deletion of temperature requirements of Vertisols
615.03	Redefinition of Arenic Albaqualfs
615.04	Establishment of great group Fragixeralfs
615.05	Changes in key to Mollisols and Inceptisols
615.06	Change in definition of Arenic Ochraqualfs
615.07	Mollic Natraqualfs and Typic Natralbolls
615.08	Changes in definitions of Diagnostic Horizons
615.09	Changes in Identification key
615.10	Changes in order of Alfisols
615.11	Changes in order of Aridisols
615.12	Changes in order of Entisols
615.13	Changes in order of Histosols
615.14	Changes in order of Inceptisols
615.15	Changes in order of Mollisols
615.16	Changes in order of Oxisols
615.17	Changes in order of Spodosols
615.18	Changes in order of Ultisols
615.19	Changes in definitions of Family and Series
615.20	Changes in classifications of Pedons in Appendix IV

§615.00 (b) Index to pages of Soil Taxonomy.

Section	Page
615.08	14
615.08	16
615.08	18
615.08	30
615.08	31
615.08	32
615.08	33
615.08	34
615.08	45
615.08	46
615.08	48
615.08	49
615.08	50
615.08	62
615.08	64
615.08	68
615.09	92
615.10	95
615.10	96
615.10	109
615.10	125
615.10	130
615.10	132
615.10	134
615.10	135
615.10	138
615.10	139
615.10	142
615.10	147
615.10	151
615.11	160
615.12	179
615.12	181
615.12	183
615.12	206
615.13	222
615.14	228
615.14	229
615.14	230
615.14	236
615.14	239
615.14	240
615.14	241
615.14	247
615.14	248
615.14	267
615.15	271
615.15	272
615.15	286
615.15	288

615.15	294
615.15	295
615.15	296
615.15	298
615.15	299
615.15	300
615.15	306
615.15	307
615.15	308
615.15	310
615.15	316
615.16	324
615.16	327
615.17	337
615.18	350
615.18	360
615.19	383
615.19	384
615.19	385
615.19	388
615.20	513
615.20	615

§615.08 Diagnostic horizons.

The following changes are approved for Chapters 3 and 4 of Soil Taxonomy, "Horizons and Properties Diagnostic for the Higher Categories: Mineral Soils" and "...: Organic Soils":

(a) Page 14, Diagnostic surface horizons; the epipedon. Add as a second paragraph to this section: "There can be only one epipedon formed in the mineral surface horizon(s) of a soil. This epipedon may be overlain by organic materials that may meet the definition of a histic epipedon (defined later). Otherwise, one soil may contain only one epipedon." delete NSTH-16

(b) Page 16, first column, item 6, line 4. Change to "the epipedon or the amounts of P_2O_5 soluble in citric acid decrease or increase irregularly with depth below the epipedon, or there are phosphate nodules within the epipedon."

(c) Page 18, Ochric epipedon, second column, line 12. After "includes" insert "some spodic horizons and".

(d) Page 30, Morphology, line 19. After "size" insert "or larger".

(e) Page 31, Identification of the spodic horizon by field criteria alone, line 6. After "size" insert "or larger".

(f) Page 32, Summary of the limits of a spodic horizon.

(1) Item 2, line 4, insert "or larger" after "size".

(2) Item 3.a., line 7, after "carbon" change to "extractable by pyrophosphate at pH 10 to clay percentage is $\geq$ 0.2".

(g) Page 33, Cambic horizon, second column.

(1) Line 6. After "not" insert "solely".

(2) Line 19. After "without" insert "appreciable[6a/]".

(3) Bottom of page. Add footnote "6a/ 'Without appreciable' means not enough to meet the requirements of other diagnostic horizons."

(h) Page 34, second column, item 2, line 6. After "horizon" insert "or overlying horizon."

(i) Page 45, first column, first complete paragraph. Add to the end of sentences 2 and 3 (lines 4 and 6) ", either dry or moist."

(j) Page 46, Petrocalcic horizon, second column, second complete paragraph, line 4. Change "Moh's scale" to "Mohs scale".

(k) Page 48, Lithic contact, second column, line 5. Change "Moh's scale" to "Mohs scale".

615-08(1)

(l) Page 49, Paralithic contact, line 5. Change "Moh's scale" to "Mohs scale".

(m) Page 50, Sandy. After "the texture of the fine earth", change to "is sand or loamy sand that contains less than 50 percent very fine sand."

(n) Page 62, Classes of soil temperature regimes, Cryic, item 1, lines 1 and 2. Change to "1. In mineral soils the mean summer soil temperature (June, July, and August in the northern hemisphere and December, January, and February in the southern hemisphere) at a depth of 50 cm or at a".

(o) Page 64, Interfingering of albic materials, second column, item 3, lines 4 and 6. Add to the end of sentences 3 and 4 ", either dry or moist."

(p) Page 68, Marl.

(1) Item 2. Insert a period after "CO_2" and delete the rest of the statement.

(2) Last line. After "inclusive" insert ", and after treatment with dilute HCl, some disintegrated plant remains may be seen."

§615.09 Identification key.

The following changes are approved in the identification key. Page 92, second column.

(a) Item F.1., line 2. Change "within" to "at".

(b) Item F.1.b., line 3. Change "deeper" to "deepest".

§615.10 Alfisols.

The following changes are approved for the order of Alfisols.

(a) Page 95, Definition, first column, item 1.a. (1). Change to "(1) A frigid, isofrigid, or colder soil temperature regime;"

(b) Page 95, Definition, second column, item 3. Change to:

"3. Do not have either a mollic epipedon or a surface horizon that, after the soil to a depth of 18 cm is mixed, meets all the requirements of a mollic epipedon, except thickness, and, in addition, have an upper subhorizon more

than 7.5 cm thick that is an argillic or natric horizon that meets the requirements of a mollic epipedon but is separated from the surface horizon by an albic horizon unless the base saturation is less than 50 percent (by NH_4OAc) in one or more subhorizons within the shallowest of the following depths:

a. 1.25 m below the upper boundary of the argillic or natric horizon, or
b. 1.8 m below the soil surface, or
c. A lithic or paralithic contact; and".

(c) Page 96, Limits between Alfisols and soils of other orders, second column.

(1) Item 7.b. Change to "b. A frigid, isofrigid, or colder soil temperature regime;".

(2) Item 7.c., line 2. Change "above" to "at".

(d) Page 109. Hydraulic conductivity is used in a few definitions, such as in Albaqualfs.

(1) Key to great groups, HAG, line 4. After "horizon" add "3a/".

(2) Second column, bottom of page. Add the following footnote: "3a/ Hydraulic conductivity is defined as the rate of internal water movement under a unit potential gradient. In this text the term refers to vertical saturated hydraulic conductivity. Slow and very slow rates refer to 4 to 10 and less than 4 cm of water per day, respectively."

(e) Page 125, Key to great groups, HEG.

(1) Item 4, line 1. Delete semicolon after "following" and add "in the argillic horizon:".

(2) Items 4.a. and 4.b. Delete "of the argillic horizon".

(3) Item 4.c. After "or both" add "in some subhorizon."

(f) Page 130, second column, after the sentence for Mollic Hapludalfs. Insert "Psammaquentic Hapludalfs are like Typic Hapludalfs except for c and h, with or without all or any of d, g, or i."

(g) Page 132, second column, after the paragraph "Mollic Hapludalfs". Insert "Psammaquentic Hapludalfs.--These soils have an argillic horizon that has a sandy particle-size class or that consists of lamellae, the uppermost of which is less than 20 cm thick. They also have ground water that fluctuates in depth unless the soil is artifically drained, and the zone in which the water stands or stood has mottles of low chroma. The mottles are at a depth of 75 cm or are in the upper 25 cm of the argillic horizon, if the upper boundary is within a depth of 50 cm. These soils are permitted but not required to have a color value, moist, of less than 4 in the Ap horizon or in the soil to a depth of 18 cm after mixing, and to have base saturation (by sum of cations) that is less than 60 percent at a depth of 1.25 m below the top of the argillic horizon or 1.8 m below the soil surface, or immediately above a lithic or paralithic contact, whichever depth is least. These soils are not extensive in the United States. They are intergrades between Psammaquents and Hapludalfs. Most of them are on lake plains adjacent to the Great Lakes. Their slopes are very gentle. Most are farmed."

(h) Page 134, Definition.

(1) Item 5, line 1. Delete semicolon after "following" and add "in the argillic horizon".

(2) Items 5.a. and 5.b. Delete "of the argillic horizon".

(3) Item 5.c. After "or both" add "in some subhorizon".

(i) Page 134, Distinctions between Typic Paleudalfs and other subgroups, second column. After the sentence for Arenic Paleudalfs, add "Arenic Plinthic Paleudalfs are like Typic Paleudalfs except for b and f and have a sandy epipedon that is between 50 cm and 1 m thick."

(j) Page 134, Distinctions between Typic Paleudalfs and other subgroups, second column. To the end of the definitions for Plinthaquic Paleudalfs and Plinthic Paleudalfs, add "with or without c".

(k) Page 135, first column, after Arenic Paleudalfs. Insert: "Arenic Plinthic Paleudalfs.--These soils have an epipedon that is between 50 cm and 1 m thick and is loamy fine sand or coarser throughout. They have $\geq$ 5 percent plinthite, by volume, in some subhorizon within a depth of 1.5 m. During rainy seasons, ground water tends to be perched above the horizon that contains plinthite. These soils are rare in the United States. They are mostly on the Coastal Plain in Texas. Most of the soils are in forest."

(l) Page 138, Key to great groups, HCD.

(1) Line 2. Place a semicolon after "or" and delete phrase from "have" to "requirements:".

(2) Item 1, line 2. After "and", add "the argillic horizon".

(3) Item 1.b.(3), line 2. After "5" insert "in the lower part of the horizon".

(m) Page 139, Distinctions between Typic Haplustalfs and other subgroups, item i.(2), line 2. Change to "thermic, isomesic, or a warmer iso-temperature regime, the".

(n) Page 142, Definition.

(1) Item 3.b., line 2. Delete "have both" and replace with "the argillic horizon has".

(2) Item 3.b.(2), line 1. Delete "in the argillic horizon".

(3) Item 3.b.(2)(c), line 3. Delete semicolon after "both" and insert "in the lower part;".

(4) Item 3.c., line 7. After "lithic" insert "or paralithic".

(o) Page 147, Key to great groups, HDE. Item 1.b.(2), line 3. Delete semicolon after "both" and add "in the lower part of the argillic horizon;".

(p) Page 151, Definition.

(1) Item 1.b.(2) Delete semicolon after "surface" and add:

"and one or both of the following in the lower part of the argillic horizon:

(a) A hue redder than 10YR and chroma more than 4 in the matrix; or
(b) Common coarse mottles that have a hue of 7.5YR or redder or chroma more than 5; or".

(2) Item 1.c. Delete.

(3) Item 1.d. Redesignate as "c".

§615.11 Aridisols.

The following change is approved for the order of Aridisols. Page 160, Description of subgroups, after paragraph for Aquic Haplargids. Insert "Arenic Haplargids.--These soils have a loamy fine sand or coarser epipedon that is 50 cm or more thick. They are similar to those in the typic subgroup but have a thick sandy epipedon. Slopes are gentle. In the United States these soils are used mostly for grazing. They are locally extensive in New Mexico."

615.12(a)

§615.12 Entisols.

The following changes are approved for the order of Entisols.

(a) Page 179, Definition, item 1, line 4. After "and" delete "more than", and after "8 percent" insert "or more".

(b) Page 181, first column, Definition, item b.(2). At the end of the paragraph, replace period with semicolon and add:

"(3) Hue is bluer than 10Y; or

(4) Any color if the color is due to uncoated grains of sand."

(c) Page 183, second column, after Sulfic Fluvaquents. Replace with "Thapto-Histic Fluvaquents are like Typic Fluvaquents except for e with or without a or d or both."

(d) Page 206, Distinctions between Typic Udipsamments and other subgroups, second column, after Alfic Udipsamments. Replace with "Aquic Udipsamments are like Typic Udipsamments except for b with or without a or d or both."

§615.13 Histosols.

The following change is approved for the order of Histosols. Page 222, Sulfihemists. Typic Sulfihemists are not defined. Delete the last sentence under Definition: "Provisionally, all Sulfihemists are considered to be Typic Sulfihemists." Add the section: "Distinctions between Typic Sulfihemists and other subgroups

Typic Sulfihemists are the Sulfihemists that
a. Do not have a mineral layer 30 cm or more thick that has its lower boundary in the control section below the surface tier.

Terric Sulfihemists are like Typic Sulfihemists except for a."

§615.14 Inceptisols.

The following changes are approved for the order of Inceptisols.

(a) Page 228, first column, item 1.f., last line. Delete and replace with "0.7 or less, or if all subhorizons between these depths have an n value of at least 0.7, there is < 8 percent clay;".

(b) Page 229, first column, item 3.b., last line. Delete all after "less" and replace with ", or if all subhorizons between these depths have an n value of at least 0.7, there is < percent clay;".

(c) Page 230, Key to suborders, IA, item 1.d., line 2. Delete "soil surface by a layer that has" and replace with "mineral soil surface by a cambic horizon or a fragipan, either or both of which have".

(d) Page 236, Definition.

(1) Item 2.c., line 4. Delete "a subhorizon above".

(2) Item 2.c., line 5, Delete "that has" and replace with ", either of which have".

(e) Page 239, Distinctions between Typic Fragiaquepts and other subgroups, item a. Change to "Do not have a histic, mollic, or umbric epipedon; and".

(f) Page 240, first column, item b, line 1. Change to "Have, in 60 percent or more of the matrix of all subhorizons between the".

(g) Page 241, first column.

(1) After sentence for Aeric Halaquepts. Insert "Mollic Halaquepts are like Typic Halaquepts except for b".

(2) First column, Description of subgroups, after paragraph for Aeric Halaquepts. Insert "Mollic Halaquepts.--These soils have epipedons other than ochric. The soils commonly have mollic epipedons that have amorphous material dominant in the exchange complex. In the United States they occur in the semiarid high valleys east of the Cascade Range in southern Oregon."

(h) Page 247, first column, Ochrepts.

(1) Line 1. After "calcic" add "or petrocalcic".

(2) Definition, item 1, line 2; delete ", isomesic,". (Isomesic soils are Tropepts.)

(i) Page 248, Distinctions between Typic Cryochrepts and other subgroups, after the sentence for Andic Cryochrepts. Insert " Aquic Cryochrepts are like Typic Cryochrepts except for c or for c and e."

(j) Page 248, Description of subgroups, first column, after paragraph for Andic Cry chrepts. Insert "Aquic Cryochrepts.--These soils have mottles with chroma of 2 r less within a depth of 75 cm and either have artificial drainage or are saturated with water within the mottled zone at some time of the year. In addition, some of these soils have base saturation that is lower than in Typic Cryochrepts."

615.12(k)

(k) Page 267, Distinctions between Typic Haplumbrepts and other subgroups, first column, before the sentence for Andic Haplumbrepts. Insert "Andaquic Haplumbrepts are like Typic Haplumbrepts except for a and b or for a, b, and f."

(l) Page 267, Description of subgroups, before the paragraph for Andic Haplumbrepts. Insert "Andaquic Haplumbrepts.--These soils have a surface mantle that has low bulk density and evidence of amorphous clays. They have mottles with low chroma at shallow depths and are saturated in the mottled horizon by a perched water table at some time of the year, usually in winter and spring. These soils are permitted to have an epipedon thicker than that of Typic Haplumbrepts. Most of the soils range from gently sloping to strongly sloping, but some are steep."

§615.15 Mollisols.

The following changes are approved for the order of Mollisols.

(a) Page 271, Definition, right column.

(1). Item 1, change to "If there is an argillic or natric horizon, have base saturation (by NH_4OAc) of 50 percent or more from its upper boundary to a depth of 1.25 m below that boundary, or 1.8 m below the surface of the soil, or to a lithic or a paralithic contact, whichever is least;".

(2). Item 2., line 1. Change to "If there is no argillic or natric horizon, have base saturation".

(b) Page 272, Limits between Mollisols and soils of the other orders, left column, item 1.a. Change to "Base saturation (by NH_4OAc) that is 50 percent or more in all subhorizons from the upper boundary of any argillic or natric horizon to a depth of 1.25 m below that boundary, or 1.8 m below the surface of the soil, or to a lithic or a paralithic contact, whichever is less, and".

(c) Page 286, Distinctions between Typic Cryoborolls and other subgroups, first column, item k. Change to "Have a regular decrease in organic carbon content with increasing depth and unless a lithic or a paralithic contact is at some depth between 50 cm and 1.25 m, have an organic carbon content of 0.3 percent or less within a depth of 1.25 m; or the slope is > .25 percent; and".

(d) Page 288, Distinctions between Typic Haploborolls and other subgroups, item e. Change to "Have a regular decrease in organic carbon content with increasing depth and unless a lithic or a paralithic contact is at some depth between 50 cm and 1.25 m, have an organic carbon content of 0.3 percent or less within a depth of 1.25 m; or the slope is > .25 percent; and".

(e) Page 294, Distinctions between Typic Rendolls and other subgroups.

(1) First column, item c., line 2. Delete "and".

(2) First column, item d.(3), last line. Delete period after "thickness" and replace with"; and".

(3) First column, after item d. add the following item: "e. Have a color value, dry, of 5.5 or less in the upper 18 cm of the mollic epipedon, after mixing, or in any Ap horizon that is > than 18 cm. thick".

(4) Second column, Entic Rendolls. Change to "Entic Rendolls are like Typic Rendolls except for e."

(f) Page 295, Key to great groups, first column, GGA, line 2. After "decrease by" add "as much as".

(g) Page 295, Distinctions between Typic Argiudolls and other subgroups, item a, line 4. Replace "about" with "above".

(h) Page 296, Distinctions between Typic Hapludolls and other subgroups, item d. Change to "Have a regular decrease in organic carbon content with increasing depth and unless a lithic or a paralithic contact is at some depth between 50 cm and 1.25 m, have an organic carbon content of 0.3 percent or less within a depth of 1.25 m, or the slope is > 25 percent; and".

(i) Page 298, Definition, line 3. Before "20" insert "as much as".

(j) Page 299, Key to great groups, first column.

(1) GFC, item 1., line 2. Before "20", insert "as much as".

(2) GFD, line 1. Change to "Other Ustolls that do not have an argillic horizon above a calcic, gypsic, or petrocalcic horizon and that have a calcic or gypsic horizon that has its".

(k) Page 300, item e of Typic Argiustolls, last line: "≤" should be "≥ "

(l) Page 306, Distincti n between Typic Natrustolls and other subgroups, item d.(1). Change to "If the soil temperature regime is mesic or thermic, are dry less than six-tenths of the time in half or

more years in some part of the moisture control section (not necessarily the same part) during a period when the soil temperature at a depth of 50 cm exceeds 5° C; or".

(m) Page 307, Definition, item 1.a.

(1) Line 2. Before "20" insert "as much as".

(2) Line 4. Change to "surface and the soil does not have a lithic or paralithic contact within that depth, and the argillic horizon has one or both of".

(n) Page 308, Distinction between Typic Paleustolls and other subgroups, second column, item g.(2), last line. Change "15° C" to "8° C".

(o) Page 310, Key to great groups, GDC, item 1., line 2. Before "20" insert "as much as".

(p) Page 316, Distinction between Typic Haploxerolls and other subgroups, first column, item f. Change to "Have a regular decrease in organic carbon content with increasing depth and unless a lithic or a paralithic contact is at some depth between 50 cm and 1.25 m, have an organic carbon content of 0.3 percent or less within a depth of 1.25 m; or the slope is > 25 percent;".

§615.16 Oxisols.

The following changes are approved for the order of Oxisols.

(a) Page 324, first column, CAB, line 2. Change "1.25 cm" to "1.25 m".

(b) Page 327, Key to great groups, left column, CEC, item 1, line 3. After "extractable" insert "bases plus extractable", to agree with item 1 in definition of Acrorthox (right column).

§615.17 Spodosols.

The following change is approved for the order of Spodosols. Page 337, left column, Lithic Haplaquods, line 2. Change to "for f, with or without a or d or both."

§615.18 Ultisols.

The following changes are approved for the order of Ultisols.

(a) Page 350, Limits between Ultisols and soils of other orders, item 1.b., line 2. Change "above" to "at".

(b) Page 360, Key to great groups, FCC, line 1. After "Other Udults" insert "that do not have a lithic or paralithic contact within 1.5 m of the mineral soil surface and".

§615.19 Family and series definitions.

The following changes are approved for the chapter "Family and Series Differentia and Names".

(a) Page 383, Definitions of classes, Fragmental, line 2. Before "interstices" insert "some of the", to be consistent with the same definition on page 50.

(b) Page 384, first column, Sandy. Change to "The texture of the fine earth is sand or loamy sand that contains less than 50 percent very fine sand; rock fragments make up < 35 percent by volume."

(c) Page 385, Control section for particle-size classes or their substitutes, first column, item A, line 2. Change semicolon to comma. Intended meaning is from surface to 36 cm or to the items listed if above 36 cm.

(d) Page 388, Depth of soil, Shallow, item a, line 7. After "Note that lithic" insert "and paralithic". All paralithic subgroups are shallow by definition.

§615.20 Appendix IV.

The following changes are approved for Appendix IV, "Descriptions of Pedons."

(a) Page 513, Pedon 14 should be classified as an "Ultic Hapludalf, fine-silty, mixed, mesic."

(b) Page 615, Pedon 66 is a Mollic (not Typic) Udifluvent.

☆ U.S. GOVERNMENT PRINTING OFFICE: 1982-380-931:SCS-880